



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,635	07/23/2003	Harry D. Cox	BUR919990240US3	8067
7590	09/21/2005			
James M. Leas IBM Corporation Intellectual Property Law 972E 1000 River Essex Junction, VT 05452			EXAMINER IM, JUNGHWA M	
			ART UNIT	PAPER NUMBER
			2811	
DATE MAILED: 09/21/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/625,635	Applicant(s) COX ET AL.	
	Examiner Junghwa M. Im	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 July 2005.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 17-50 is/are pending in the application.
- 4a) Of the above claim(s) 17-25 and 48-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 38-40 and 47 is/are rejected.
- 7) ☒ Claim(s) 41-46 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of claims 38-47 in the reply filed on July 12, 2005 is acknowledged.

### ***Claim Objections***

Claims 41-46 are objected to because of the following informalities.

Claim 41 recites a limitation of said periphery of the shadow mask without antecedent basis. And claims 42-46 recite a limitation of said mask without antecedent basis.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 39 and 47 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 39 recites a limitation of "said improved contact processing of said perimeter chips is additional dummy solder bumps to support a second shadow mask used to deposit an additional layer of material on said solder bumps so said second shadow mask does not damage perimeter chip solder bumps." It is unclear how the contact processing of the chips is equivalent to the dummy solder bumps which are elements, not an act of the processing.

Art Unit: 2811

Claim 47 recites a limitation of “said improved contact processing of said perimeter chips is more uniform plasma etching of contacts on the wafer and lower contact resistance for perimeter chips.” It is unclear how the improved contact processing of said perimeter chips is lower contact resistance for perimeter chips since the lower contact resistance is the property of the chips not an act of the processing.

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 38 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chakravorty (US 6181569).

Regarding claim 38, it is obvious that Figures 8d-8f show that metal bumps [311, 314] is formed through a shadow mask (column 9, lines 11-15) comprising the steps of:

providing an array of holes in the shadow mask [to form metal bumps 311, 314 on the chip] corresponding to contacts on an array of chips on a wafer [312 in Fig. 8b], said array of chips including perimeter chips extending along a periphery of the wafer [in Fig. 8e], and

providing additional holes [to form metal bumps on the peripheral chips] in the shadow mask located adjacent holes corresponding to most of said perimeter chips for improving contact processing of said perimeter chips.

Art Unit: 2811

Chakravorty fails to show that “said additional holes in the shadow mask located adjacent holes corresponding to most of said perimeter chips are dummy holes.” However, it would be obvious that the additional holes on the periphery chips of Chakravorty would be dummy holes since the periphery chips do not have functionality.

Regarding claim 40, Fig. 8e of Chakravorty shows that said additional dummy holes are omitted in saw blade lanes.

*Allowable Subject Matter*

Claims 41-46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter.

Prior art fails to teach or render obvious a semiconductor device with combinations of elements as set forth in the claims 41, including in particular a process of fabricating a shadow mask comprising the additional dummy holes omitted in a ring shaped exclusion zone along the periphery of the shadow mask while beyond the perimeter chips and beyond the dummy holes

Prior art fails to teach or render obvious a semiconductor device with combinations of elements as set forth in the claims 42, including in particular a process of fabricating a shadow mask comprising a step of inspecting the mask using dummy holes along an edge of a dicing lane to align the shadow mask to an inspection device

Prior art fails to teach or render obvious a semiconductor device with combinations of elements as set forth in the claims 43, including in particular a step of inspecting the mask using

Art Unit: 2811

a pattern of additional holes located beyond holes corresponding to the perimeter chips, the additional holes for aligning the shadow mask to an inspection device while the pattern of additional holes does not print on the wafer.

Prior art fails to teach or render obvious a semiconductor device with combinations of elements as set forth in the claims 44, including in particular the pattern of additional holes located to be covered by a guard ring.

Prior art fails to teach or render obvious a semiconductor device with combinations of elements as set forth in the claims 45, including in particular a step of inspecting the mask using a covering for the additional dummy holes.

Prior art fails to teach or render obvious a semiconductor device with combinations of elements as set forth in the claims 46, including in particular the covering for the additional dummy holes is a ring with an inside edge corresponding to outside edges of perimeter chips.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (571) 272-1655. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Loke can be reached on (571) 272-1657. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2811

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jmi

Signature  
Primary Examiner  
*Steven Loh*